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ABSTRACT

This study was conducted to investigate pupil responses to lessons taught by preservice teachers, and it addresses teachers' concept mapping as related to interactive behavior or effectiveness in the classroom. Lessons taught by student teachers (N=10) were examined for what pupils thought were the lesson's key ideas and for two things pupils heard anyone say during a lesson. Student teachers were then divided into three groups: the first group emphasized both teaching principles and pupil characteristics in lesson planning; the second emphasized pupil characteristics but not teaching principles; and the third did not emphasize either pupil characteristics or teaching principles. Results indicate that pupils of student teachers in the first group evidenced the highest rates of engagement, followed by pupils of student teachers in the second group, while pupils of student teachers in the third group provided evidence of low rates of engagement. Findings also indicate that there is a relationship between prospective teachers' concepts of teacher planning as measured by concept maps and a connection between teacher conceptions of teaching and pupil perceptions of lessons taught. Five tables display data on student responses. (LL)

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Patterns of Pupil Responses to Lessons Associated With Alternative Perspectives on Teacher Planning.

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RUNNING HEAD: Pupil Responses

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Patterns of Pupil Responses to Lessons
Associated With Alternative
Perspectives on Teacher Planning.

Several authors, including Kagan (1990) have commented on the difficulties surrounding research on teacher cognition, especially aspects relating to the ambiguous notions found in the literature on teacher cognition, the inability of research methods to assess teacher cognition directly, the time-consuming nature of the work, and problems related to rendering comparative judgements about teachers' cognitions. In discussing these difficulties, Kagan (1990) raises an important question: Is the idea of research on teacher cognition either too broad (and therefore unwieldy and vague) or too specific and atomistic (and therefore of little practical use) in its present form?

To address these questions she considered problems inherent in several major areas of research on teacher thinking including (a) ways of assessing teachers' beliefs, (b) methods using contextual analyses of teachers' language, (c) taxonomies assessing teacher's self-reflection and awareness of problem-solving, (d) evaluation of teachers' pedagogical content knowledge and (e) concept mapping (Kagan, 1990, p. 421). Her review led her to conclude that to date alternative ways of studying teacher cognition do not include enough information about how researchers elicit and evaluate the teacher cognition they study. She also concluded that, given the diverse nature of the educational traditions underlying research on teacher

thinking, there was a need for a new rhetoric of research in this area. Furthermore, she suggested a set of criteria which might precipitate a new paradigm of dialogue for inquiry in teacher cognition research by taking into account (a) an emphasis on qualitative descriptions to identify important correlates of teacher cognition, (b) the definition of desirable teacher behavior and cognitions within instructional models based in previous empirical and theoretical research, (c) a preference for multimethod approaches, and (d) an awareness of the difficulty of establishing ecological validity for techniques sensitive to short-term changes in teacher cognition.

The Present Study

Kagan (1990) defines ecological validity as "...kinds of evidence researchers provide concerning the relevance of a measurement technique to classroom life" (p. 422) and asks whether this evidence is of theoretical importance alone or whether it assists our understanding by identifying observable and non-observable components of classroom instruction that help pupils learn. Kagan, therefore, views the presentation of certain information in studies of teacher cognition as important when they (a) describe a methodological approach to measuring teacher cognition which includes information about administration and scoring procedures, (b) document the salient qualities of a particular measurement procedure, and (c) demonstrate viability of a measurement procedure in terms of a coherent set of findings.

In addition, Kagan makes the point that there have been very few studies which have studied the association between teacher's performance on a teaching task and their classroom instruction or student outcomes. Pertinent to this study, Kagan (1991) raised a specific criticism about concept maps when she noted that there appears to be little evidence that teachers' conceptions as reflected in concept maps are related to teachers' interactive behavior or effectiveness in the classroom.

This investigation uses pupil responses to lessons taught by preservice teachers in an attempt to address this specific criticism. It is also part of a larger study determining the ecological validity of concept mapping as a viable teacher cognition research technique (see Artiles, 1992; Morine-Dershimer, 1992; Tankersley, 1992).

Specifically, the study was framed by two research questions:

1. Are pupils' patterns of statements about "key ideas" in lessons related to prospective teachers' patterns of emphasis in concept maps of teacher planning?
2. Are pupil reports of what they heard anyone saying in the lessons related to prospective teachers' patterns of emphasis in concept maps of teacher planning?

Instrumentation

The procedures for measuring pupil responses to lessons that were used in this study were developed and tested in two earlier studies. A study by Morine-Dershimer (1989) addressed the issue

of teacher cognition by examining ways of providing novice teachers with feedback about the effect of their teaching on their pupils. In order to evaluate a general methods course designed to increase prospective teachers' awareness of pupil contributions in lessons, Morine-Dershimer planned stimulated recall interviews of student teachers' lessons and examined how the student teachers interpreted pupil responses to these lessons.

Pupil responses were collected at the conclusion of each lesson. The pupils reported what they thought was a key idea of the lesson and two things they heard anyone say during the lesson. In the stimulated recall interviews, the student teachers categorized the pupils' comments, thereby revealing which aspects of pupil thinking or learning the student teachers were most attentive to. Morine-Dershimer examined the same pupil response data and devised a category system of pupil statements which alluded to (a) key ideas of the lesson (divided into teacher-oriented, pupil-oriented, and topic-oriented) and (b) what they heard other people say in the lesson (divided into who was heard and whether the statements they heard were about lesson content, related to content, or unrelated to content). She modified the classification system to make 6 categories of statements which appear, with examples from the current study, in Table 1.

Insert Table 1 about here

Morine-Dershimer (1989) also discovered differential patterns of pupil response from class to class. She examined these differential response patterns across classes using two different systems for analyzing interactive behavior. These analyses revealed that (a) there was a difference in the patterns of classroom interaction exhibited by the male and female student teachers and (b) these differences corresponded closely to the classroom differences in pupil statement responses. Morine-Dershimer concluded that patterns of pupil responses gathered from this category system were closely linked to the interactive patterns observed in the lesson.

In a later study Morine-Dershimer (1991) extended these preliminary findings by describing a shift in the group patterns of pupil key idea statements according to differences in instructional procedures used by prospective and experienced teachers. Seven teachers each taught two lessons to their classes, one more teacher-directed, the other more pupil-centered. After each lesson the teachers collected pupils' statements of what they thought was a key lesson idea as well as reports of two things they heard anybody saying during the lesson. Morine-Dershimer organized these responses into the categories developed in the earlier study. She noted that there was a marked increase in the frequency of pupil-oriented key idea

statements, and reports of hearing pupil comments about lesson content, as the teachers' instructional process moved from teacher-directed to pupil-centered. Further, she found a high frequency of reports of hearing pupil comments unrelated to lesson content in lessons where frequent off-task behavior was observed.

Morine-Dershimer concluded that these categories of pupil responses provided a relatively simple procedure which could give novice teachers immediate systematic feedback about pupils' interpretations of teaching, teacher directions, and lesson content, as well as some indication of the pupils' attentiveness to the lesson. Based on results of these earlier studies, she used this form of pupil response data as a measure of pupil outcomes in this study.

Participants

I examined ten lessons taught by six male and four female student teachers completing their Fall semester secondary school teaching practicum in the final year of their teacher education program. They had participated in an earlier, larger study of change in conceptions of teacher planning as measured by concept maps (Morine-Dershimer, 1991), and were invited to participate in this study based on their patterns of concept map emphasis (Tankersley, 1992).

The student teachers were divided into three groups. Those in Group A (Amy, Anne, Anita) emphasized both teaching principles and pupil characteristics as elements of teacher planning. Those

in Group B (Bill, Betsy, Brenda, Brian) emphasized pupil characteristics but not teaching principles. Those in Group C (Clay, Chip, Candace) emphasized neither pupil characteristics nor teaching principles.

Data Collection

Each of the student teachers was videotaped teaching a lesson to a class of their own choosing. All the lessons were planned by the student teachers and were part of their normal sequence of instruction for the selected classes. Just before the end of the lesson the student teachers handed out index cards to the pupils and instructed the pupils to complete the cards in the following way: On one side, they were to record what they thought had been a key idea of the lesson; on the other side of the card, they were to write down two things they heard anyone saying during the lesson. The index cards were collected.

Later in the day, each student teacher participated in a stimulated recall interview over the videotaped lesson. In all but one case the interview was conducted by the researcher who videotaped the lesson. After watching the videotape of their teaching and commenting in the stimulated recall, the student teachers were asked to examine and comment on the pupil response cards. All their comments from the interviews were audiotaped and transcribed.

Background of the Lessons

The lessons, in classes ranging in size from 8 to 22 pupils, covered a variety of subjects, topics, ability levels, and

grades. For example, there were lessons in English, biology, physics, history, and math. The topics included such things as poetry criticism, a discussion of the Odyssey, role playing to learn about the use of punctuation to denote inflection, a lesson on Islam, and procedures for solving interest rate problems. The ability level of the pupils ranged from low and average abilities to high achievers and members of an honors class. Some classes consisted of mixed grade levels, while others constituted a single grade only. All upper grade levels (8-12) were represented. A summary of the lessons appears in Table 2.

Insert Table 2 about here

Further information relating to the student teachers' views of their classes was obtained from their transcribed stimulated recall interviews. Predictably, their views varied as much as the subjects they taught and the ability levels of their pupils. A summary of their descriptions is reported in Table 3.

Insert Table 3 about here

Data Analysis

Based on previous investigations described earlier, I expected that the following results might emerge from the analysis of pupil responses to the student teachers' lessons:

1. More pupil-oriented key idea statements in lessons

taught by student teachers in group A, based on the possibility that student teachers who emphasized both Pupil Characteristics and Teaching Principles as important elements of teacher planning might teach more pupil-centered lessons;

2. More reports of hearing pupil comments on lesson content in lessons taught by student teachers in Group A, based also on the possibility that student teachers who emphasized Pupil Characteristics and Teaching Principles as important elements of teacher planning might teach more pupil-centered lessons; and
3. More reports of hearing pupil non-related comments in lessons taught by student teachers in Group C, based on the possibility that student teachers who did not emphasize either Pupil Characteristics or Principles of Teaching might have lessons with more off-task pupil behavior.

The pupil responses were classifi steps. First, the research-team member who had obse deotaped the lesson categorized the responses. A few nses were uninterpretable even after checking the videotaped lessons to see if they could be categorized from the lesson context (for example, "I don't know") and in some instances pupils had handed in blank cards. The uninterpretable comments and blank cards were eliminated from further steps of the analysis. Second, each member of the research team then met with the senior researcher

to corroborate their classification and to resolve any differences in categorization. Raw frequency counts of the key ideas (one response per pupil) and the comments heard by pupils (two responses per pupil) were then tabulated.

Statistical analysis of the two research questions proceeded as follows:

1. The key idea statements (one response per pupil) were aggregated from the several classes within each student teacher group (A,B, & C) and entered into a chi-square.
2. The pupil reports of what they heard anyone say during the lesson (two responses per pupil) were analyzed separately across the 6 response categories by using ANOVA in two phases. The first phase tested whether there were significant differences between classes within the three groups (A, B, & C). Results revealed significant differences across all response categories. The second phase, using a procedure recommended and described by Feldt (1985), tested whether there were greater differences between groups than between classes within groups.

Results

Data on pupils' key idea statements were entered into a chi-square of key idea orientation by student teacher group (A, B, or C). This showed significant differences ($\chi^2 = 12.45$, df = 4, $p. < 0.025$). Group A (emphasizing Pupil Characteristics and Teaching Principles) had more pupil-oriented reports than expected by chance, while Group B (emphasizing Pupil

Characteristics only) had fewer pupil-oriented statements than expected. The result are summarized in Table 4.

Insert Table 4 about here

There were no significant group differences in 5 of the 6 categories of pupil reports of what they heard anyone say in the lesson. The category of pupil comments unrelated to lesson content, however, did show a significant difference [MSR = 12.19, (2,7), p. < .01]. A post hoc t-test revealed that pupils of student teachers in Group C (who emphasized neither Pupil Characteristics nor Teaching Principles), reported hearing significantly higher number of pupils' unrelated comments than either pupils of students teachers in Group A (who emphasized Pupil Characteristics and Teaching Principles) or pupils of student teachers in Group B (who emphasized Pupil Characteristics only). The results are summarized in Table 5.

Insert Table 5 about here

These results show that two of the three expectations for the study were supported, namely, that:

1. There were more pupil-oriented key idea statements in lessons taught by student teachers in Group C, suggesting that student teachers who emphasized both Pupil Characteristics and Teaching Principles in their

concept maps of teacher planning taught more pupil-centered lessons; and

2. There were more pupil reports of hearing pupil non-related comments in lessons taught by student teachers in Group C, suggesting that student teachers who did not emphasize either Pupil Characteristics or Principles of Teaching tended to have lessons with more off-task pupil behavior.

Discussion

Papers in this symposium explore alternative means of uncovering evidence for a relationship between representations of teachers' conceptions and interactive behavior or teaching effectiveness. This study tested such a relationship by examining patterns of pupil responses to lessons associated with the teaching actions of student teachers who had previously exhibited alternative perspectives of planning as reflected on their concept maps.

The results of this study show that patterns of pupil responses appear to change according to the planning perspectives exhibited by preservice teachers in their lessons. In lessons taught by student teachers who emphasized both Pupil Characteristics and Teaching Principles as an important part of their planning, pupils reported hearing more pupil-oriented key idea statements, a pattern typical of pupil-centered lessons. On the other hand, for student teachers who did not emphasize either Pupil Characteristics or Teaching Principles as an important part

of their planning, the frequency of pupil reports of hearing pupils' comments unrelated to lesson content was much higher, a pattern typical in lessons with observably high off-task pupil behavior. In lessons taught by student teachers who emphasized Pupil Characteristics, but not Teaching Principles as important elements in teacher planning, pupil response patterns were not indicative of off-task pupil behavior, but they were also not indicative of pupil-centered lessons.

Another way of interpreting these results is to consider that high frequencies of pupil-oriented key idea statements and low frequencies of hearing pupil comments unrelated to lesson content combine to provide evidence of pupil engagement in lessons. Conversely, lower frequencies of pupil-oriented key idea statements and high frequencies of attention to pupils' unrelated comments combine to provide evidence of lack of pupil engagement. In this study, then, pupils of student teachers in Group A gave evidence of the highest rates of engagement, followed by pupils of student teachers in Group B, while pupils of student teachers in Group C provided evidence of low rates of engagement.

These results suggest that the presence or absence of an emphasis on Pupil Characteristics or Teacher Planning as elements of prospective teachers' conceptions of teacher planning can each make a separate and independent contribution to teacher effectiveness.

These results from pupils' responses to lessons were

corroborated by the student teachers' interactive behavior, as measured by the BTAP evaluation system (see Artiles, 1992). The BTAP observation data showed that the student teachers who emphasized aspects of planing associated with social context (Pupil Characteristics and Teaching Principles) also exhibited most teaching competencies associated with classroom social context, (e.g., "Individual Difference" and "Awareness"). The student teachers who did not see Pupil Characteristics or Teaching Principles as important for their planning exhibited few of these competencies. The students teachers who emphasized Pupil Characteristics but not Teaching Principles exhibited a moderate number of these teaching competencies.

The findings of this study provide supporting evidence to indicate that there is a relationship between prospective teachers' concepts of teacher planning, as measured by concept maps and their teaching effectiveness, as measured by pupil responses to their lessons. The findings of this study also address the larger issue of ecological validity raised by Kagan (1990). The study provides evidence that the measurement technique of concept mapping is relevant to classroom life by documenting a clear connection between teacher conceptions of teaching and pupil perceptions of lessons taught.

Table 1.

Summary of Pupil Response Categories

Category	Subcategory	Definition	Example
Key Idea Statements	1. Teacher-Oriented	Statements focusing on the teachers' role in the lesson (e.g., "to teach us," "to tell us").	"To teach us how we can change the meaning of a word just by pronouncing it different."
	2. Topic-Oriented	Statements focusing on the lesson topic.	"There are many, many different types of love. Love is a different thing for each person and poetry is a good way of portraying this."
	3. Pupil-Oriented	Statements focusing on the pupils' role in the lesson (e.g., "to learn," "to figure out."	"The class learned step by step how to read a poem to help in the understanding of the poem."

Pupil Statements of What They Heard	1. Teacher-Content	Teacher statements about lesson content.	"Sponges are the simplest form of lower invertebrates."
	2. Pupil-Content	Pupil statements about lesson content.	"I don't think they were really in love--it's routine--they'd miss it if it didn't happen."
	3. Teacher-Content Related	Teacher statements related to lesson content, usually giving directions.	"The comic strips will be worked on tomorrow."
	4. Pupil-Content Related	Pupil statements related to lesson content, usually asking about procedures.	"What page are we on?"
	5. Teacher-Content Unrelated	Teacher comments unrelated to lesson content, usually disciplinary comments.	"Put your feet down."
	6. Pupil-Content Unrelated	Pupil comments unrelated to lesson content, usually from side conversations.	"You know what I mean, jelly-bean?"

Table 2

Summary of Lessons Taught by Teaching Associates

Teacher	Grade	Class	Topics and Activities
Anne	11-12 n=8	Humanities (elective)	Discussed upcoming "Love" project. Pupils read their own love poems to class. Discussed handout on rules of poetry criticism. Class paired up, analyzed different poems. Pupils shared criticisms with class. Homework assignment on poetry given.
Anita	9-10 n=18	Biology (high achievers)	Group worksheets handed out. Class assigned to cooperative learning groups and topics. One "expert" per group. Groups worked at activity centers (videotapes, slides) discussing different vertebrates. Teaching associate circulated and assisted.
Amy	8 n=17	Language Arts (average/ low ability)	Began with written quiz. Discussed topic: "Character." Assigned homework and another quiz for following day. Students handed out chart of suspects from Hound of the Baskervilles. Discussion and pupils fill in chart noting characteristics of suspects.
Bill	10 n=20	World History (hetero-genous ability)	Reviewed previous day's lesson. Lesson topic: Islam. Played Moroccan "rap" song & discussed. Discussed reading assignment from previous day. Passed out sheets for note taking. Discussion resumed. Key words on board & pupils took notes. Worksheet handed out and discussed. Homework assigned.

Betsy	10 n=22	English (high achievers)	Class paired up to act out skit using various inflections of a single word. Whole class discussion of skit as a lead-in for discussion on use of punctuation to denote inflection.
Brenda	11-12 n=20	Physics (average ability)	Discussion of molecules/mass. Teaching associate demonstrated problems on board. Class worked individually on other problems. Problems then reviewed on board. New problems assigned for seatwork.
Brian	9 n=13	English (honors class)	Class discussion of Odyssey. Read/discussed extracts. Class paired up to work on their own comic strips featuring heroic characters.
Clay	11-12 n=20	Algebra (pre-calculus)	Teacher discussion and examples of procedures for problem-solving interest rate problems. Continued with discussion of square matrices. Problems worked out on board Homework assigned & begun in class.
Chip	10-11 n=22	Math	Lesson topic: Inequalities and constraints. Mainly lecture with minimal discussion from class. New problem worked on by class--teaching associate did calculations on board. Assigned another problem from textbook.
Candace	10-12 n=19	Inter-national Relations (elective)	Lesson topic: Spectrum of political positions. Key statements for lesson on board after sidetracked discussion. Discussed characteristics of some political persuasions & various political leaders. Leaders placed on continuum of political persuasion on board. Lesson ended without clear conclusion.

Table 3

Teaching Associates' Descriptions of Their Pupils

Student	Description of Their Pupils
Anne	"These kids are the brightest kids [in the county]. They're the gifted and talented students...They do not like to read...They read something, and then they have no concept of what they've read...And their vocabulary is so limited that they miss a lot...They're really good kids...they're not interested in reading, they think they work hard, but they're a little bit lazy."
Anita	"A good class...they get very bored with the lecture format...They're a very hands-on group, and they're usually pretty on-task when we assign them a lab...they are generally interested in learning."
Amy	"...the most mixed group I have....most are average to low ability, with a few higher level students. We have a couple of kids who are LD in here."
Bill	"There are some very high achievers in the class. There are some very low achievers in the class...It's a very varied class. All in all, I don't think there's a problem with anyone in the class...As you saw, we have Michael, who's a paraplegic...And he's a very good student...And this last test, I don't know whether everybody was interested in the subject or what, but there were well over a dozen A's in this class on that test, with no curve. And there were only three failing grades in the entire class...And that I think is entirely on their effort. So they can be motivated, and they do enjoy learning. Not every day. but - "
Betsy	"It's a pretty calm class, as far as attitude goes...they're all intelligent, and they're all probably college-bound. They're not extremely noisy or obnoxious in the classroom, but they do have an ability to work together and keep me talking."

Brenda	"They are pretty much an average class. They are not my brightest class and they are not my worst class. As far as behavior is concerned, I think they are usually pretty attentive, even though they do tend to talk somewhat. They're my favorite class. They ask a lot of questions, and I can get them engaged in the lesson pretty easily."
Brian	"I'm amazed by the fact that these kids can read in-depth at this young level...These honors kids expect a lot from a teacher, and if you don't give them what they're looking for they'll ask you about it, whereas other kids will just shut down usually."
Clay	"They're all headed for college. Maybe not 4-year institutions right off the bat, but they are all headed for college, and 18 of the 21 are seniors."
Chip	"They're all very bright. They're the kind of kids that can pick up things on their own. Sometimes they don't seem to be all that excited about math. And sometimes they're very quiet. It's hard to get them to interact. They aren't at all questioning."
Candace	"A very vocal and opinionated group and they're very willing to state their ideas and interact in the class setting, and they're a really good group of kids. They range between middle ability level...upper middle to really extremely high intellectual thinking skills...They all really like the subject, which is good. And they seem to like each other, too, which is important."

Table 4.

Patterns of Pupil Responses to Lessons: Key Idea Statements

Pupil Statements of Key Ideas	Group A	Group B	Group C
	Pupil Characteristics & Teaching Principles	Pupil Characteristics Only	Neither
Teach-Oriented	1	4	1
Topic-Oriented	22	54	40
Pupil-Oriented	19	11	19

Chi-square = 12.45, df = 4, $p < .025$;

Contingency coefficient = .26

Table 5.

Patterns of Pupil Responses to Lessons: Reports of Hearing Pupils' Unrelated Comments (mean frequencies)

Group A	Group B	Group C
Emphasized Pupil Characteristics & Teaching Principles	Emphasized Pupil Characteristics Only	Emphasized Neither
Anne's Class $n = 8$ $\bar{X} = .125$	Bill's Class $n = 20$ $\bar{X} = .150$	Clay's Class $n = 20$ $\bar{X} = .650$
Anita's Class $n = 18$ $\bar{X} = .278$	Betsy's Class $n = 22$ $\bar{X} = .091$	Chip's Class $n = 22$ $\bar{X} = .364$
Amy's Class $n = 17$ $\bar{X} = .118$	Brenda's Class $n = 20$ $\bar{X} = .20$	Candace's Class $n = 19$ $\bar{X} = .789$
	Brian's Class $n = 13$ $\bar{X} = .231$	

ANOVA Summary Table

Source	df	SS	MS	MSR	p
Between Teacher Groups	2	.390	.195	12.19	.01
Between Classes Within Groups	7	.110	.016		

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